

Church Lane-Saul
Agricultural Land Classification
September 1998

Resource Planning Team
Bristol
FRCA Western Region

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CHURCH LANE SAUL AGRICULTURAL LAND CLASSIFICATION SURVEY

INTRODUCTION

1 This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 1.7 ha of land at Church Lane Saul. Field survey was based on 4 auger borings and 1 soil profile pit and was completed in September 1998.

2 The survey was conducted by the Resource Planning Team of FRCA Western Region on behalf of MAFF in its statutory role in the preparation of the Stroud District Local Plan.

3 Information on climate, geology and soils and from previous ALC surveys was considered and is presented in the relevant section. Apart from the published regional ALC map (MAFF 1977) which shows the site at a reconnaissance scale as Grade 2, the site had not been surveyed previously. The current survey uses the Revised Guidelines and Criteria for grading the quality of agricultural land (MAFF 1988) and supersedes any previous ALC survey. Grade descriptions are summarised in Appendix I.

4 At the time of survey the field had been ploughed and rolled following arable cropping.

SUMMARY

5 The distribution of ALC grades is shown on the accompanying 1:10,000 scale ALC map. The detail of information shown at this scale is appropriate to the intensity of field survey but could be misleading if enlarged or applied to small areas. Areas are summarised in the Table 1.

Table 1 Distribution of ALC grades CHURCH LANE SAUL

Grade	Area (ha)	% Surveyed Area (1.7 ha)
2	1.7	100
Total site area	1.7	

6 The whole site has been mapped as Grade 2, very good quality agricultural land. The soils were found generally not to experience any wetness limitation, however, the subsoils are stony and a minor droughtiness limitation exists.

CLIMATE

7 Estimates of climatic variables for this site were derived from the published agricultural climate dataset, Climatological Data for Agricultural Land Classification (Meteorological Office 1989) using standard interpolation procedures. Data for key points around the site are given in Table 2 below.

8 Since the ALC grade of land is determined by the most limiting factor present overall climate is considered first because it can have an overriding influence by restricting land to a lower grade despite more favourable site and soil conditions Parameters used for assessing overall climate are accumulated temperature a measure of relative warmth and average annual rainfall a measure of overall wetness The results shown in Table 2 indicate that there is no overall climatic limitation

9 Climatic variables also affect ALC grade through interactions with soil conditions The most important interactive variables are Field Capacity Days (FCD) which are used in assessing soil wetness and potential Moisture Deficits calculated for wheat and potatoes which are compared with the moisture available in each profile in assessing soil droughtiness limitations These are described in later sections

Table 2 Climatic Interpolations CHURCH LANE SAUL

Grid Reference	SO 753091
Altitude (m)	11
Accumulated Temperature (day C)	1517
Average Annual Rainfall (mm)	751
Overall Climatic Grade	1
Field Capacity Days	165
Moisture deficit (mm) Wheat	105
Potatoes	97

RELIEF

10 The altitude is at approximately 10 metres and the site is flat apart from slight evidence of previous ridge and furrow but this does not pose any limitation to the versatility of the land

GEOLOGY AND SOILS

11 The underlying geology of the site is shown on the published geology map (IGS 1972) as gravels from the third terrace of the River Severn Most of the site was found to have stony subsoils relating to the geology

12 Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1 250 000 (SSEW 1983) as Badsey 1 Association

13 Badsey 1 Association is described as well drained calcareous and non calcareous fine loamy soils over limestone gravel with some deep fine loamy soils and fine loamy soils over gravel The soils found during the recent survey were predominantly from the Badsey Association

AGRICULTURAL LAND CLASSIFICATION

14 The distribution of ALC grades found by the current survey is shown on the accompanying 1:10 000 scale map and areas are summarised in Table 1. The detail of information shown at this scale is appropriate to the intensity of field survey but could be misleading if enlarged or applied to small areas.

Grade 2

15 All of the site has been mapped as Grade 2 very good quality agricultural land. The soils were impenetrable to the auger at around 50 cm. Examination of the soil profile pit showed that the lower subsoils were stony with around 33% stone by volume. The texture of the lower subsoils was also sandier than the topsoil. The combination of the soil texture and stone content imposes a minor droughtiness limitation to these soils. The soils are well drained and are assessed as Wetness Class 1 (see Appendix 2). A single boring on the eastern edge of the site was not stony and had a slowly permeable lower subsoil. This boring has a moderate wetness limitation and is limited to Subgrade 3a, however, it is included within the general Grade 2 mapping unit covering the whole site.

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24 September 1998

REFERENCES

INSTITUTE OF GEOLOGICAL SCIENCES (1972) Sheet 234 1 50 000 series Solid and Drift edition IGS London

HODGSON J M (Ed) (1997) Soil Survey Field Handbook Soil Survey Technical Monograph No 5 Silsoe

MAFF (1977) 1 250 000 series Agricultural Land Classification South West Region MAFF Publications Alnwick

MAFF (1988) Agricultural Land Classification of England and Wales Revised Guidelines and Criteria for grading the quality of agricultural land MAFF Publications Alnwick

METEOROLOGICAL OFFICE (1989) Climatological Data for Agricultural Land Classification Meteorological Office Bracknell

SOIL SURVEY OF ENGLAND AND WALES (1983) Sheet 5 Soils of South West England 1 250 000 scale SSEW Harpenden

SOIL SURVEY OF ENGLAND AND WALES (1984) Soils and Their Use in South West England Bulletin No 14 SSEW Harpenden

APPENDIX I

DESCRIPTION OF GRADES AND SUBGRADES

Grade 1 excellent quality agricultural land

Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly include top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

Grade 2 very good quality agricultural land

Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.

Grade 3 good to moderate quality agricultural land

Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown, yields are generally lower or more variable than on land in Grades 1 and 2.

Subgrade 3a good quality agricultural land

Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.

Subgrade 3b moderate quality agricultural land

Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass, or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

Grade 4 poor quality agricultural land

Land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (eg cereals and forage crops) the yields of which are variable. In most climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.

Grade 5 very poor quality agricultural land

Land with very severe limitations which restrict use to permanent pasture or rough-grazing except for occasional pioneer forage crops

Source MAFF (1988) Agricultural Land Classification of England and Wales Revised Guidelines and Criteria for Grading the Quality of Agricultural Land MAFF Publications Alnwick

APPENDIX II

DEFINITION OF SOIL WETNESS CLASSES

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile

Wetness Class I

The soil profile is not wet within 70 cm depth for more than 30 days in most years

Wetness Class II

The soil profile is wet within 70 cm depth for 31-90 days in most years or if there is no slowly permeable layer within 80 cm depth it is wet within 70 cm for more than 90 days but not wet within 40 cm depth for more than 30 days in most years

Wetness Class III

The soil profile is wet within 70 cm depth for 91-180 days in most years or if there is no slowly permeable layer within 80 cm depth it is wet within 70 cm for more than 180 days but only wet within 40 cm depth for between 31 and 90 days in most years

Wetness Class IV

The soil profile is wet within 70 cm depth for more than 180 days but not within 40 cm depth for more than 210 days in most years or if there is no slowly permeable layer within 80 cm depth it is wet within 40 cm depth for 91-210 days in most years

Wetness Class V

The soil profile is wet within 40 cm depth for 211-335 days in most years

Wetness Class VI

The soil profile is wet within 40 cm depth for more than 335 days in most years

Notes The number of days specified is not necessarily a continuous period

In most years is defined as more than 10 out of 20 years

Source Hodgson J M (Ed) (1997) Soil Survey Field Handbook Soil Survey Technical Monograph No 5 Silsoe

APPENDIX III

ABBREVIATIONS AND TERMS USED IN SURVEY DATA

Soil pit and auger boring information collected during ALC survey is held on a computer database and is reproduced in this report. Terms used and abbreviations are set out below. These conform to definitions contained in the Soil Survey Field Handbook (Hodgson 1997)

1 Terms used on computer database in order of occurrence

GRID REF National 100 km grid square and 8 figure grid reference

LAND USE At the time of survey

WHT	Wheat	SBT	Sugar Beet	HTH	Heathland
BAR	Barley	BRA	Brassicas	BOG	Bog or Marsh
OAT	Oats	FCD	Fodder Crops	DCW	Deciduous Wood
CER	Cereals	FRT	Soft and Top Fruit	CFW	Coniferous Woodland
MZE	Maize	HRT	Horticultural Crops	PLO	Ploughed
OSR	Oilseed Rape	LEY	Ley Grass	FLW	Fallow (inc Set aside)
POT	Potatoes	PGR	Permanent Pasture	SAS	Set Aside (where known)
LIN	Linseed	RGR	Rough Grazing	OTH	Other
BEN	Field Beans	SCR	Scrub		

GRDNT Gradient as estimated or measured by hand held optical clinometer

GLEYSPL Depth in centimetres to gleying or slowly permeable layer

AP (WHEAT/POTS) Crop adjusted available water capacity

MB (WHEAT/POTS) Moisture Balance (Crop adjusted AP - crop potential MD)

DRT Best grade according to soil droughtiness

If any of the following factors are considered significant Y will be entered in the relevant column

MREL	Microrelief limitation	FLOOD	Flood risk	EROSN	Soil erosion risk
EXP	Exposure limitation	FROST	Frost prone	DIST	Disturbed land
CHEM	Chemical limitation				

LIMIT The main limitation to land quality. The following abbreviations are used

OC	Overall Climate	AE	Aspect	EX	Exposure
FR	Frost Risk	GR	Gradient	MR	Microrelief

FL	Flood Risk	TX	Topsoil Texture	DP	Soil Depth
CH	Chemical	WE	Wetness	WK	Workability
DR	Drought	ER	Erosion Risk	WD	Soil Wetness/Droughtiness
ST	Topsoil Stoniness				

TEXTURE Soil texture classes are denoted by the following abbreviations

S	Sand	LS	Loamy Sand	SL	Sandy Loam
SZL	Sandy Silt Loam	CL	Clay Loam	ZCL	Silty Clay Loam
ZL	Silt Loam	SCL	Sandy Clay Loam	C	Clay
SC	Sandy clay	ZC	Silty clay	OL	Organic Loam
P	Peat	SP	Sandy Peat	LP	Loamy Peat
PL	Peaty Loam	PS	Peaty Sand	MZ	Marine Light Silts

For the sand loamy sand sandy loam and sandy silt loam classes the predominant size of sand fraction will be indicated by the use of the following prefixes

F	Fine (more than 66% of the sand less than 0.2mm)
M	Medium (less than 66% fine sand and less than 33% coarse sand)
C	Coarse (more than 33% of the sand larger than 0.6mm)

The clay loam and silty clay loam classes will be subdivided according to the clay content **M** Medium (< 27% clay) **H** heavy (27-35% clay)

MOTTLE COL Mottle colour using Munsell notation

MOTTLE ABUN Mottle abundance expressed as a percentage of the matrix or surface described

F few <2% **C** common 2-20% **M** many 20-40% **VM** very many 40%+

MOTTLE CONT Mottle contrast

F	faint indistinct mottles evident only on close inspection
D	distinct mottles are readily seen
P	Prominent mottling is conspicuous and one of the outstanding features of the horizon

PED COL Ped face colour using Munsell notation

GLEYS If the soil horizon is gleyed a **Y** will appear in this column. If slightly gleyed an **S** will appear

STONE LITH Stone Lithology One of the following is used

HR	All hard rocks and stones	SLST	Soft oolitic or dolomitic limestone
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CH	Chalk	FSST	Soft fine grained sandstone
ZR	Soft argillaceous or silty rocks	GH	Gravel with non porous (hard) stones
MSST	Soft medium grained sandstone	GS	Gravel with porous (soft) stones
SI	Soft weathered igneous or metamorphic rock		

Stone contents are given in % by volume for sizes >2cm >6cm and total stone >2mm

STRUCT The degree of development size and shape of soil peds are described using the following notation

<u>Degree of development</u>	WA	Weakly developed Adherent	WK	Weakly developed
	MD	Moderately developed	ST	Strongly developed
<u>Ped size</u>	F	Fine	M	Medium
	C	Coarse	VC	Very coarse
<u>Ped Shape</u>	S	Single grain	M	Massive
	GR	Granular	AB	Angular blocky
	SAB	Sub angular blocky	PR	Prismatic
	PL	Platy		

CONSIST Soil consistence is described using the following notation

L	Loose	VF	Very Friable	FR	Friable	FM	Firm
VM	Very firm	EM	Extremely firm	EH	Extremely Hard		

SUBS STR Subsoil structural condition recorded for the purpose of calculating profile droughtiness **G** Good **M** Moderate **P** Poor

POR Soil porosity If a soil horizon has poor porosity with less than 0.5% biopores >0.5mm a **Y** will appear in this column

IMP If the profile is impenetrable to rooting a **Y** will appear in this column at the appropriate horizon

SPL Slowly permeable layer If the soil horizon is slowly permeable a **Y** will appear in this column

CALC If the soil horizon is calcareous with naturally occurring calcium carbonate exceeding 1% a **Y** will appear this column

2 Additional terms and abbreviations used mainly in soil pit descriptions

STONE ASSESSMENT

VIS	Visual	S	Sieve	D	Displacement
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MOTTLE SIZE

EF	Extremely fine <1mm	M	Medium 5-15mm
VF	Very fine 1-2mm	C	Coarse >15mm
F	Fine 2-5mm		

MOTTLE COLOUR May be described by Munsell notation or as ochreous (OM) or grey (GM)

ROOT CHANNELS In topsoil the presence of rusty root channels should also be noted

MANGANESE CONCRETIONS Assessed by volume

N	None	M	Many	20-40%
F	Few <2%	VM	Very Many	>40%
C	Common 2-20%			

POROSITY

P	Poor	less than 0.5% biopores at least 0.5mm in diameter
G	Good	more than 0.5% biopores at least 0.5mm in diameter

ROOT ABUNDANCE

The number of roots per 100cm ²		Very Fine and Fine	Medium and Coarse
F	Few	1-10	1 or 2
C	Common	10-25	2-5
M	Many	25-200	>5
A	Abundant	>200	

ROOT SIZE

VF	Very fine	<1mm	M	Medium	2-5mm
F	Fine	1-2mm	C	Coarse	>5mm

HORIZON BOUNDARY DISTINCTNESS

Sharp	<0.5cm	Gradual	6-13cm
Abrupt	0.5-2.5cm	Diffuse	>13cm
Clear	2.5-6cm		

HORIZON BOUNDARY FORM Smooth wavy irregular or broken *

* See Soil Survey Field Handbook (Hodgson 1997) for details

SITE NAME		PROFILE NO	SLOPE AND ASPECT	LAND USE	Av Rainfall	751 mm	PARENT MATERIAL	
Church Lane Saul		Pit 1	0	Ploughed + rolled	ATO	1517 day C	3rd Terrace Gravels	
JOB NO		DATE	GRID REFERENCE	DESCRIBED BY	FC Days	165	PSD SAMPLES TAKEN	
90/98		23/9/98	SO 753091	GMS	Climatic Grade	1		
					Exposure Grade	1		

Horizon No	Lowest Av Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness Size Type and Field Method	Mottling Abundance Contrast Size and Colour	Mangan Concs	Structure Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots Abundance and Size	Calcium Carbonate Content	Horizon Boundary Distinctness and form
1	28	MCL	10YR41	<1% HR>2cm <1% HR>2mm (+d)	None	None					CVF		Clear Smooth
2	40	MCL	10YR42	<1% HR (s)	FDFO 10YR56 (patchy)	None	MDCSAB	Friable	Mod	Good	CVF		Clear Smooth
3	60	HCL	10YR53	<1% HR 2cm 9% HR > 2 mm (+d)	None	None	MDCSAB	Friable	Mod	Good	CVF		Clear Wavy
4	70	MSL	10YR54	8% HR>2cm (s) 29% HR 2mm (+d)	None	None	WKFSAB	V Friable	Good	Good	CVF		Clear Wavy
5	90+	LMS	10YR54	8%HR>2 m (s) 33% HR>2mm (s+d)	None	None	Too dry to assess		Assume Mod	Good	FVF		

Profile Gleyed From	Not gleyed	Available Water	Wheat	116 mm	Final ALC Grade	2
Slowly Permeable Horizon From	No spl		Potatoes	109 mm	Main Limiting Factor(s)	Droughtiness
Wetness Class	I	Moisture Deficit	Wheat	105 mm		
Wetness Grade	1		Potatoes	97 mm		
		Moisture Balance	Wheat	11 mm	Remarks	Auger boring at pit site was imp at 65 cm
			Potatoes	12 mm		
		Droughtiness Grade	2	(Calculated to 120 cm)		